PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2003-225214
(43)Date of publication of application : 12.08.2003

(51)Int.Cl. A61B 5/0245
A61B 5/145

(21)Application number : 2002-027337
(22)Date of filing : 04.02.2002

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(54) DEVICE FOR DETECTING BIOINFORMATION

(57)Abstract:
PROBLEM TO BE SOLVED: To suppress increase in cost with increase in the number of sensors in a device for detecting bioinformation in which sphygmogram is detected by using sensor output signals.
SOLUTION: The device for detecting bioinformation has a plurality of sensors equipped with a light-emitting means for irradiating the blood vessels in a detection area with a sensor lighta light receiving means for receiving a reflection light from the blood vessels and outputting signals in accordance with the amount of received lightand detects hemoglobin flow in blood based on output signal from each sensor. This device for detecting bioinformation is provided with a sensor switching circuit 23 which has a comparator 26 for comparing the output values of the output signals of respective sensors to each other and selects the output signals having lower voltageand also has a multiplexer 27 for outputting only the output signals of the sensor outputting the output signals selected by the comparator 26. The sensor switching circuit 23 decreases the number of input signals or signal lines to a microcomputer and the number of signal linesthus modification of the microcomputer caused by deficiency of the number of input ports and increase in the load of processing becomes unnecessary and cost increase with increase in the number of sensors can be suppressed.

CLAIMS

[Claim(s)]
[Claim 1]It has two or more sensors provided with a luminescent means which irradiates with sensor light to a blood vessel in a detection areaand a light-receiving means to receive catoptric light from said blood vesseland to output a signal according to the light incomeA signal comparing means which is a biological information sensing device which detects a hemoglobin flow in blood based on an output signal from said each sensorcompares an output value of an output signal of each of said sensorand chooses said output signal in accordance with a predetermined standardA biological information sensing device having a selection signal output means which gives priority over an output signal of other sensors to an output signal of said sensor which outputted said output signal with said selected signal comparing meansand outputs it.
[Claim 2]A biological information sensing devicewherein said signal comparing means chooses what has the lowest output value among said output signals in the biological information sensing device according to claim 1.
[Claim 3]A biological information sensing devicewherein said selection signal output means outputs only an output signal of said sensor which outputted a signal with said selected signal comparing means in the biological information sensing device according to claim 1.
[Claim 4]In a biological information sensing device given in any 1 paragraph of Claims 1-3have said sensorand two or more luminescent means which output sensor light of different wavelength said signal comparing meansA biological information sensing device comparing the output signals outputted from said light-receiving means in response to sensor light of predetermined wavelength among said wavelength.
[Claim 5]A biological information sensing devicewherein said signal comparing means compares the output signals most outputted from said light-receiving means in response to sensor light of long wavelength in the biological information sensing device according to claim 4.
[Claim 6]A biological information sensing devicewherein said signal comparing means is a comparator in a biological information sensing device given in any 1 paragraph of Claims 1-5 and said selection signal output means is a multiplexer.
[Claim 7]A biological information sensing device installing said sensor in a wheel of a car in a biological information sensing device given in any 1 paragraph of Claims 1-6.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the device which detects the hemoglobin flow in blood by lightand acquires biological information especially about the biological information sensing device which detects biological

informationsuch as a pulse wave and blood pressure.
[0002]
[Description of the Prior Art]In recent yearsa pulse rate and blood pressure are detected based on the pulse wave produced by blood circulationand the method of judging the obstacle of the circulatory system and a test subject's condition is advocated. In this caseas a pulse wave detection meansa human body is irradiated with sensor light from a light emitting deviceand what detects a pulse wave using that reflected light quantity is known.Thereinfrared rays are irradiated by a test subject's skin by the light emitting device which used LEDand it is absorbed and reflected through the blood vessel near the skin surface by hemoglobin in blood. And this catoptric light is received with the photo detector using a photo-transistorand the flow rate change of hemoglobin is detected by the size of that light income.
[0003]Herein the capillary which exists near the skinit is supposed that there is a significant relation a hemoglobin flow and blood pressure. In this caseby a capillarysince there is almost no contractionblood vessel width is considered to be approximately regulated. On the other handhemoglobin is the biggest resistance thing in the flow of blood. For this reasonin the blood vessel of constant widtha hemoglobin flow increases at the time of blood sending outand a difference arises to a hemoglobin flow in the time (**********) (at the time of the lowest blood pressure) of blood sending out and un-sending out. That ishemoglobin concentration and blood pressure are considered to be in proportionality.
[0004]Hemoglobin has the character which absorbs infrared raysand if hemoglobin increasesthe part and the infrared ray quantity absorbed will also increase. Thenwhen it irradiates with infrared rays from a light emitting device and the catoptric light is measuredthe amount of infrared absorption will increase with the increase in hemoglobinand the quantity of catoptric light will decrease. Thereforeif the light income in a photo detector is measuredthe change in hemoglobin can be detected and a pulse wave can be obtained based on thisand it becomes possible to compute a blood pressure value in easy proportion.
[0005]On the other handtwo or more sensor units provided with the light receiving and emitting element in such a pulse wave detection apparatus are providedthe signal considered to have caught biological information more certainly from two or more sensor signals is used selectivelyand aiming at improvement in pulse wave detection precision is also performed. A pulse wave is detected with the signal from a sensor with the most sufficient stateand it enables it to obtain few stable detection results of variation there by choosing most signals of the pulse wave amount of informationand detecting a pulse wave based on it. In this casethe output signal from each sensor is inputted into a microcomputer (it is hereafter written as a microcomputer)and analysis of a pulse wave is conducted with a microcomputer. And based on this analysis resulta signal with much amount of information is chosen from sensor signalsand detection of a pulse wave is performed using that signal.
[0006]

[Problem(s) to be Solved by the Invention]Howeverin the pulse wave sensing device using such two or more sensorsif the number of sensors increasesthe input signal line to a microcomputer will increaseand there is a possibility that the input ports of a microcomputer may run short. For examplein the case of the device which has two sensor per one sensor unit **and **the common power source wires 52a and 52bsensor **each signal wire $53a_{1 of **}$ $53a_2$$53b_1$and $53b_2$ are wired by each sensor units 51A and 51B like drawing 8. And the four same signal wires as the number of sensors are inputted into a microcomputerand when the number of sensors is one and a sensor is increased to pulse wave detection having been possible for with a microcomputer with two input portsa microcomputer with four input ports is needed. In order to maintain processing speed since the processing burden in the part and a microcomputer increases if the number of input signals to a microcomputer increases with the increase in a sensora more highly efficient microcomputer is needed.

[0007]Thusa microcomputer must be changed into the highly efficient thing which has many numbers of input ports although detection precision will improveif the number of sensors is made to increase. And if the price of microcomputers also becomes high according to performancefor examplea 16-bit microcomputer is changed into a 32-bit thingthe price of microcomputer simple substances will be about 5 times. For this reasonwhen the number of sensors was increasedthere is a problem that cost goes up beyond sensor incrementand that measure was demanded.

[0008]In the biological information sensing device which performs pulse wave detection using a sensor output signalthe purpose of this invention avoids the microcomputer change accompanying the increase in the number of sensorsand there is in controlling increase of apparatus cost. [0009]

[Means for Solving the Problem]A luminescent means whichas for a biological information sensing device of this inventionthis invention irradiates with sensor light to a blood vessel in a detection areaIt has two or more sensors provided with a light-receiving means to receive catoptric light from said blood vesseland to output a signal according to the light incomeand a biological information sensing device which detects a hemoglobin flow in blood based on an output signal from said each sensor is characterized by comprising the following:

A signal comparing means which compares an output value of an output signal of each of said sensorand chooses said output signal in accordance with a predetermined standard.

A selection signal output means which gives priority over an output signal of other sensors to an output signal of said sensor which outputted said output signal with said selected signal comparing meansand outputs it.

[0010]Since it was made to output a selected output signal from a selection signal output means after choosing an output signal outputted from two or more sensors in a signal comparing meansif it was in this inventionit becomes possible to reduce the number of input signals to a microcomputer arranged in the latter partand a

number of a signal wire rather than the number of sensors. For this reasonit becomes unnecessary to change a microcomputer by a shortage of the number of input portsor the increase in a processing burdenand cost escalation accompanying an increase in the number of sensors is suppressed. [0011]It may be made to choose what has the lowest output value among said output signals in said signal comparing means in said biological information sensing device. In this casea sensor and a human body stickwhen a sensing state is goodcatoptric light from the skin increases as compared with a case where a crevice is between a sensor and a human bodyor contact pressure with the skin is extremely small etc.and an output value of an output signal of a photo detector becomes lower. Thereforewhen comparing an output signalby choosing a signal which has the lowest output valuean output signal from a sensor of the best state can be chosenand it becomes possible to aim at improvement in detecting accuracy of biological information.
[0012]It may be made to output only an output signal of said sensor which outputted a signal with said selected signal comparing means from said selection signal output means in said biological information sensing device. Therebythe number of output signals becomes possible [reducing a signal number inputted into a rat tail and a microcomputer at necessary minimumand a number of a signal wire to necessary minimum].
[0013]Two or more luminescent means which output sensor light from which wavelength differs in said sensor are establishedand it may be made to compare the output signals outputted from said light-receiving means in response to sensor light of predetermined wavelength among said wavelength in said signal comparing means in said biological information sensing device. It may be made to compare the output signals most outputted from said light-receiving means in response to sensor light of long wavelength in said signal comparing means in that case. In this casein seeing a contact state of a sensor and a human bodysensor light of short wavelength (especially visible Mitsunori enclosure) tends to contain a noiseand shows a reaction which was [long wavelength side] better and where it was stabilized to a contact state. Thereforeit becomes possible by comparing an output value using a signal by the side of long wavelength by a signal comparing means to choose a good sensor of a sensing state more certainly.
[0014]On the other handin said biological information sensing devicea comparator is used as said signal comparing meansand a multiplexer may be used as said selection signal output means. In this caseeven if it combines a multiplexer with a comparatorsince it is lower than microcomputer change expensethat price becomes possible [saving expense which an increase in the number of sensors takes].
[0015]In said biological information sensing devicesaid sensor may be installed in a wheel of a car. Therebya driver's biological information is grasped exactly and it becomes possible to emit warning beforehand to drowsiness or fatigue.
[0016]
[Embodiment of the Invention]Hereafteran embodiment of the invention is

described in detail based on Drawings. The explanatory view and drawing 2 in which the outline of a biological information sensing device in which drawing 1 is the 1 embodiment of this invention is shown are an explanatory view showing the mounting state of the sensor in the biological information sensing device of drawing 1.

[0017]As shown in drawing 1in the biological information sensing device of this embodimenttwo sensor ** and ** are provided in each sensor units 1A and 1Brespectively. Each sensor units 1A and 1B can detect biological information from the handif it is attached to the right and left of the wheel 10 of a car and a driver grasps the handle 10as shown in drawing 2. The common power source wires 21a and 21bsensor **each signal wire $22a_{1of**}$ $22a_2$$22b_1$and $22b_2$ are wired by the sensor units 1A and 1Band it is connected to the microcomputer 24 via the sensor switch circuit 23. Hereonly the two signal wires 25L and 25S are inputted into the microcomputer 24 by work of the sensor switch circuit 23and the signal wire is collected from four two. The signal wire 25L currently pulled out from the sensor switch circuit 23 in drawing 1 and two lines other than 25S are the power supply and line GND of the sensor switch circuit 23.

[0018]The explanatory view in which drawing 3 shows the composition of sensor ** and **and drawing 4 are the sectional views which met the A-A line of drawing 3. Since the sensor units 1A and 1B are the same structuresthey explain only the sensor unit 1A here. The sensor unit 1A is the device main frame 2 with the composition of having attached the light emitting device (luminescent means) 3 and the photo detector (light-receiving means) 4and is connected to the sensor switch circuit 23 or the microcomputer 24 via the power source wire 21asignal wire $22a_1$and $22a_2$. If a driver (test subject) grasps the handle 10the contact surface 8 will contact the human body 9and the sensor light 14 will be irradiated with the sensor unit 1A by the human body 9 from the light emitting device 3 by instructions of the microcomputer 24. And the catoptric light 16 is received with the photo detector 4and biological informationsuch as a test subject's pulse waveis computed with the microcomputer 24 based on the light income.

[0019]As shown in drawing 2the device main frame 2 is formed in plate-like with the hard synthetic resinand comprises the transparent translucent parts 11a and 11b and the opaque non-** part 12. In this casethe translucent parts 11a and 11b are formed with transparent synthetic resinssuch as an acrylic and polycarbonateand the non-** part 12 is formed with the synthetic resin of the dark color which colored the acrylic black. These translucent parts 11a and 11b and the non-** part 12 are molded into one by two-color moldingand as shown in drawing 2they are laid underground in the handle 10.

[0020]The placed opposite of the light emitting device 3 which used LEDand the photo detector 4 using a photo-transistor is carried out to the device main frame 2. Both the light emitting device 3 and the photo detector 4 are accommodated in the non-** part 12and the translucent parts 11a and 11b are allocated in the front sides of both the elements 3 and 4. In this caseinsertion molding is carried out at the translucent parts 11a and 11b and the non-** part 12and accommodation

immobilization of both the elements 3 and 4 is carried out into the device main frame 2 at one.
[0021]On the other handthe detection part 32 is constituted from the sensor unit 1A by the light emitting device 3 and the photo detector 4 of the couple. 2 setsthe detection part 32a in which the detection part 32 succeeds in sensor **and the detection part 32b which succeeds in sensor **are providedand each detection parts 32a and 32b are provided with the light emitting device 3p and the photo detector 4pand the light emitting device 3q and the photo detector 4q. Crisscross arrangement of both the detection parts 32a and 32b is carried out right-angledand the detection area 17 overlaps. The light emitting devices 3p and 3q irradiate with the sensor light 14p and 14q of wavelength differentrespectively. Therebyin the sensor unit 1Atwo kinds of different biological information can be acquired now with the same detecting point.
[0022]Ahead of the light emitting devices 3p and 3qthe inside 13 of a sensor light proposal is formed. This inside 13 of a sensor light proposal is formed of the translucent part 11a and the non-** part 12and it is constituted so that the sensor light 14p and 14q irradiated from the light emitting devices 3p and 3q may be drawn in the human body 9 direction. Ahead of the photo detectors 4p and 4qthe inside 15 of a catoptric light proposal is formed. This inside 15 of a catoptric light proposal is formed of the translucent part 11b and the non-** part 12and it is constituted so that the catoptric light 16p and 16q from the human body 9 may be drawn in the photo detector 4p and the direction of 4q. And the sensor light 14p and 14q is irradiated in the center of the device main frame 2and the detection area 17 which can receive light with the photo detectors 4p and 4q is formed in it for the catoptric light 16p and 16q.
[0023]In the inside 13 of a sensor light proposalas the end of central slippage of the translucent part 11a shows drawing 4it is a curved surfaceand adjacent arranging of the non-** part 12 is carried out bordering on this curved surface. The boundary part of the translucent part 11a and the non-** part 12 is the sensor light reflection part 18the sensor light 14p and 14q irradiated from the light emitting devices 3p and 3q is reflected hereand the optical path is changed into the human body 9 side. In this casein the sensor light reflection part 18the illuminating angle of the sensor light 14p and 14q to the human body 9 can be suitably adjusted now by adjusting the angle of inclination of that curved surface.
[0024]Also in the inside 15 of a catoptric light proposalthe end of central slippage of the translucent part 11b serves as a curved surfaceand adjacent arranging of the non-** part 12 is carried out bordering on this curved surface. The boundary part of the translucent part 11b and the non-** part 12 is the catoptric light reflection part 19the catoptric light 16p and 16q of the sensor light 14p and 14q from the human body 9 is reflected hereand the optical path is changed into the photo detector 4p andq [4] side. In this casein the catoptric light reflection part 19without providing heights in the contact surface 8by adjusting the curvature of that curved surfacethe catoptric light 16p and 16q can be turned to the photo detectors 4p and 4qand it can condense. Therebyflattening of the contact surface

8 is carried outand it is equipped with the sensor unit 1A flat-tapped with the surface of the handle 10.
[0025]In such a biological information sensing deviceif the device main frame 2 is embedded for the handle 10 so that the detection area 17 may start a driver's palmand an ignition switch is turned onthe sensor light 14p and 14q will be irradiated from the light emitting devices 3p and 3q. The sensor light 14p and 14q irradiated from the light emitting devices 3p and 3q follows the inside of the translucent part 11a allotted ahead of the light emitting devices 3p and 3qrespectivelyand results in the sensor light reflection part 18. The boundary part is formed in the curved surface as mentioned abovethe sensor light 14p and 14q is reflected hereandas for the sensor light reflection part 18the optical path is changed into the human body 9 side. It is reflected by many organizations in a skin surface or a human body in the detection area 17and the sensor light 14p and 14q which faced to the human body 9 turns into the catoptric light 16p and 16qand returns to the device main frame 2 side.
[0026]The catoptric light 16p and 16q reflected in the device main frame 2 side goes into the translucent part 11band results in the catoptric light reflection part 19. The boundary part is formed in the curved surfaceas for the catoptric light 16p and 16qthe catoptric light reflection part 19 is also reflected hereand the optical path is changed into the photo detector 4p andq [4] side. The catoptric light 16p and 16q reflected by the catoptric light reflection part 19 follows the inside of the translucent part 11band results to the photo detectors 4p and 4q. And in the photo detectors 4p and 4qthe signal according to the light volume which received light is outputtedand it is sent out to the microcomputer 24.
[0027]Herehemoglobin in blood has the character which absorbs infrared rays as mentioned aboveand if the sensor light 14p and 14q shines upon the capillary near the skinetc.it will be absorbed by the hemoglobin which exists there. Thereforeas for the catoptric light 16p and 16qlight volume changes with the absorbed amountsand the light volume received with the photo detectors 4p and 4q also changes with the quantity of hemoglobin. Soin the microcomputer 24a hemoglobin flow is analyzed from the signal from the photo detectors 4p and 4qand a blood pressure valuea pulse ratea pulse waveetc. are computed based on it.
[0028]On the other handwhat supported oxygenand the thing which is not supported exist in blood hemoglobin. According to artificers' investigationhuman being's stressfatiguesleepinessetc. can be judged by the pulse ratethe peak value of blood pressureand hemoglobin non-supporting [oxygen support and]its difference valueetc. For exampleabout stressthe peak value of hemoglobin of oxygen support and not supporting is a downward tendencythe time between peak values becomes shortand when the difference value of a height peak difference is an upward tendencyit is accepted that stress is in an increase tendency. And the hemoglobin which supported oxygen absorbs the infrared rays by the side of long wavelengthand the hemoglobin which does not support oxygen has the character which absorbs the infrared rays by the side of short wavelength.
[0029]Thenit enables it to monitor the oxygen carrying state of hemoglobin in the

biological information sensing device concerned using the infrared rays of wavelength which is different by both the detection parts 32a and 32b. That isthe element which emits the sensor light 14q of the wavelength which has a light emission peak at 720 nm again at the light emitting device 3q in the element which emits the sensor light 14p of the wavelength which has a light emission peak in the light emitting device 3p here at 800 nm is used. The photo detector 4p receives specifically the catoptric light 16q which is 900 nm which hemoglobin of oxygen support reflectedand the photo detector 4q is set up receive specifically the catoptric light 16p which is 680 nm which hemoglobin without oxygen support reflected. That isthe direction of the detection part 32a (sensor **) which has the light emitting device 3p and the photo detector 4p irradiates with the infrared rays of long wavelengthand receives light. The wavelength of the infrared rays by which light receiving and light emitting are carried out will not be limited to said wavelengthif the existence of oxygen support of hemoglobin is specified.

[0030]And from the sensor units 1A and 1B which have such detection parts 32a and 32b (sensor ****)as shown in drawing 1signal wire $22a_1$ etc. are pulled outand it is connected to the microcomputer 24 via the sensor switch circuit 23. The block diagram showing a signal-processing process [in / in drawing 5 / the biological information sensing device of drawing 1] and drawing 6 are the circuit diagrams showing the composition of the sensor switch circuit 23 of the biological information sensing device of drawing 1.

[0031]In the biological information sensing device concernedas shown in drawing 5the output signal (pulse wave signal) of the analog outputted from the photo detectors 4p and 4q of each sensor units 1A and 1B is first inputted into the sensor switch circuit 23. And one of 2 sets of output signals is chosen in the sensor switch circuit 23and it is inputted into the microcomputer 24 through **** which detects the amplifying circuit 28the peak detection circuit 29peak value **** of a high pulse waveand the peak value Vb of a low pulse waveand the Vb detector circuit 30.

[0032]The sensor switch circuit 23 comprises the comparator (signal comparing means) 26 and the multiplexer (selection signal output means) 27as shown in drawing 6. The output signal of sensor ** of each sensor units 1A and 1Bi.e.the output signal from the photo detector 4q by the side of long wavelengthis inputted into the comparator 26. In drawing 5the output signal from sensor [of the sensor unit 1A] ** attaches the numerals "LL" Becoming as an output signal from the long wavelength side (L) sensor of the sensor unit arranged on the left-hand side of the handle 10 (L). Similarlyas for sensor ** of "LR" and left-hand sidein right-hand side (sensor unit 1B) sensor **sensor ** of "SL" and right-hand side is "SR."

[0033]In the sensor switch circuit 23the output signals (LLLR) by the side of the long wavelength in both the sensor units 1A and 1B are first compared by the comparator 26. Herein the biological information sensing device concernedif a crevice is between the contact surface 8 of a sensorand the skin or the contact pressure of the contact surface 8 and the skin is extremely smallgood hemoglobin

catoptric light is not obtained and exact information cannot be acquired. In this casethe catoptric light from the skin increases as compared with the case where the contact surface 8 sticks with the skinand there is a crevice when a sensing state is good etc.and the output value of the output signal of the photo detectors 4p and 4q becomes lower. Thereforewhen an output signal is comparedit is presumed that the direction of the near sensor by which the signal with lower voltage was acquired is in a better state. The comparator 26 compares using the signal by the side of long wavelengthin order that the short wavelength side may show the reaction which was [long wavelength side] better and where was easy to contain a noiseand it was stabilized to the contact state.

[0034]Thenafter the comparator 26 compares output signalsa signal with low voltage is chosenand the output is set to "L"when output signal LL of the sensor unit 1A is low and "H" and output signal LR of the sensor unit 1B are low. On the other handthe signal (LLLRSLSR) of each sensor [of both the sensor units 1A and 1B] ** and ** is inputted into the multiplexer 27and a signal is selectively outputted to it based on the output of the comparator 26. Drawing 7 is a truth value table of the multiplexer 27 (TC74HC4052A).

[0035]As shown in drawing 7when the output of the comparator 26 is "L" (i.e.when output signal LR of the sensor unit 1B is low)the set of the input signal of a port "0X0Y"i.e.the output signal by the side of the sensor unit 1BLR, SRis outputted. On the other handwhen the output of the comparator 26 is "H" (i.e.when output signal LL of the sensor unit 1A is low)the set of the input signal of a port "1X1Y"i.e.the output signal by the side of the sensor unit 1ALL, SLis outputted. Although it fixed to L and the input B was used in the biological information sensing device concernedwhen the number of sensors increases furtherit is also possible to perform an output control using the input B.

[0036]And the output signal from the multiplexer 27 is sent to a latter circuitand is inputted into the microcomputer 24 by the two signal wires 25L and 25S. That isthe signal considered to have caught biological information more certainly is chosenand only most signals of the pulse wave amount of information are sent to the microcomputer 24 in the sensor switch circuit 23. Thereforeeven when the data of a side with a degree of adhesion high among the sensor units 1A and 1B allotted to the right and left of the handle 10 with a human body is acquired and it is detached any of the right and left of the handle 10 they areinformation can be acquired from the sensor of the grasped side.

[0037]Thusthe input to the microcomputer 24 can be collected to two kinds of signalswithout dropping detecting accuracy on the biological information sensing device by this inventionsince most signals of the amount of information are chosen in the sensor switch circuit 23 and it sends to the microcomputer 24. That isconventionallysorting of the output signal which was being performed within the microcomputer 24 was performed in the sensor switch circuit 23 established in the preceding paragraph of the microcomputer 24the number of input signals to the microcomputer 24 was extracted on the preceding paragraph storyand the burden of the microcomputer 24 is eased. It becomes possible to reduce the number of

input signals to the microcomputer 24and the number of a signal wire rather than the number of sensorsand it becomes unnecessary for this reasonto change a microcomputer by the shortage of the number of input portsor the increase in a processing burden. The price of the sensor switch circuit 23 which consists of the comparator 26 or the multiplexer 27 on the other hand is lower than the upgrade expense of a microcomputer. For this reasonthe number of sensors can be made to increasewithout being accompanied by microcomputer changeand it becomes possible to aim at improvement in pulse wave detection precisionsuppressing increase of the cost accompanying the increase in the number of sensors.

[0038]It cannot be overemphasized that it can change variously in the range which this invention is not limited to said embodiment and does not deviate from the gist. That isalthough the above-mentioned embodiment described the biological information sensing device using the sensor which has a light receiving and emitting elementcorporeal thingssuch as not only hemoglobin in blood but metal goodsa living thinga gasare widely detectable by using the sensor concerned. The composition of this invention For examplethe passage sensing sensor and positioning sensor of metal partsIt is usable also to the part which could apply also as object sensing devicessuch as passage sensing sensorssuch as a human bodyan insectan animaland an ionization smoke detectorand was performing object detection using the proximity switch mechanical or conventionally magneticand optical. Since a black thing absorbs infrared rays well in the case of the sensor using infrared raysit is also possible to classify a detected material to two sortsblack and whiteor to stick a monochrome label on a detected material and to classify them.

[0039]On the other handin the above-mentioned embodimentalthough the example which chooses the output signal of voltage low in the sensor switch circuit 23 was describedthe high voltage may be chosen and outputted in the case where the device concerned is used as an object sensing device as mentioned above etc. The output signal from the sensor switch circuit 23 may output three or more kinds of signalssuch as 2 sets of four etc. kindswhen it is not limited to two kinds per setfor examplea margin is in a microcomputer. It is also possible for there to be three or more sensorsand to extend the comparator 26 in that caseto choose one signal as the multiple-times deed last target for selection of a signalor to extend the multiplexer 27. In additionwhen it is considered as the number of sensors with three or more piecestwo or more output signals may be chosen in the sensor switch circuit 23.

[0040]Although the above-mentioned embodiment showed the example using that by which orthogonal arrangement of sensor ** and the ** is carried out to the sensor units 1A and 1Bwhat carried out parallel arrangement of sensor ** and the ** like drawing 8 may be used. Although the above-mentioned embodiment showed the example which installed the biological information sensing device by this invention in the wheel of a caran installed position is not limited to a handle. In additionwhen a driver's stressfatiguesleepinessetc. are detected with the biological information sensing device concernedit may be made to warn a driver of it with a

buzzera telltale lightetc.
[0041]
[Effect of the Invention]Since it was made to output the selected output signal from a selection signal output means after choosing the output signal outputted from two or more sensors in the signal comparing means according to the biological information sensing device of this inventionit becomes possible to reduce the number of input signals to the microcomputer arranged in the latter partand the number of a signal wire. For this reasonit becomes possible for it to become unnecessary to change a microcomputer by the shortage of the number of input portsor the increase in a processing burdenand to suppress increase of the cost accompanying the increase in the number of sensors.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is an explanatory view showing the outline of the biological information sensing device which is the 1 embodiment of this invention.
[Drawing 2]It is an explanatory view showing the sensor mounting state in the biological information sensing device of drawing 1.
[Drawing 3]It is an explanatory view showing the composition of the sensor in the biological information sensing device of drawing 1.
[Drawing 4]It is the sectional view which met the A-A line of drawing 3.
[Drawing 5]It is a block diagram showing the signal-processing process in the biological information sensing device of drawing 1.
[Drawing 6]It is a circuit diagram showing the composition of the sensor switch circuit of the biological information sensing device of drawing 1.
[Drawing 7]It is a truth value table of a multiplexer.
[Drawing 8]It is an explanatory view showing the outline of the conventional biological information sensing device.
[Description of Notations]
1A and 1B Sensor unit
2 Device main frame
3 Light emitting device
3p and 3q Light emitting device
4 Photo detector
4p and 4q Photo detector
8 Contact surface
9 Human body
10 Handle
11a Translucent part
11b Translucent part
12 Non-** part
13 The inside of a sensor light proposal

14 Sensor light
14p14q sensor light
15 The inside of a catoptric light proposal
16 Catoptric light
16p and 16q Catoptric light
17 Detection area
18 Sensor light reflection part
19 Catoptric light reflection part
21a and 21b Power source wire
$22a_1$ $22a_2$ $22b_1$ and $22b_2$ signal wire
23 Sensor switch circuit
24 Microcomputer
25L and 25S Signal wire
26 Comparator (signal comparing means)
27 Multiplexer (selection signal output means)
28 Amplifying circuit
29 Peak detection circuit
30 ****Vb detector circuit
32 Detection part
32a and 32b Detection part
51A and 51B Sensor unit
52a and 52b Power source wire
$53a_1$ $53a_2$ $53b_1$ and $53b_2$ signal wire